General

Guideline Title

An evidence-based review: helmet efficacy to reduce head injury and mortality in motorcycle crashes: EAST practice management guidelines.

Bibliographic Source(s)

MacLeod JB, Digiacomo JC, Tinkoff G. An evidence-based review: helmet efficacy to reduce head injury and mortality in motorcycle crashes: EAST practice management guidelines. J Trauma. 2010 Nov;69(5):1101-11. [45 references] PubMed

Guideline Status

This is the current release of the guideline.

The Eastern Association for the Surgery of Trauma (EAST) reaffirmed the currency of the guideline in October 2015.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

The levels of recommendation (I-III) and classification of evidence (I-III) are defined at the end of the "Major Recommendations" field.

Level I

All motorcyclists should wear motorcycle helmets when riding motorcycles to reduce the incidence of head injury and severe head injury after a crash.

Note: This statement was made a level recommendation despite a lack of class I data because of the volume of consistent class II data, including robust prospective data, to support this finding without any methodologically similar data to refute it.

Level II

All motorcyclists should wear motorcycle helmets when riding motorcycles to improve overall survival and reduce head injury-related mortality after a crash.

Mandatory universal motorcycle helmet laws should be introduced or reenacted to reduce mortality and head injury after a crash.

Definitions

Classes of Evidence

Class I: Prospective, randomized clinical trials

Class II: Clinical studies in which data were collected prospectively or retrospective analyses based on clearly reliable data

Class III: Studies based on retrospectively collected data

Levels of Recommendation

Level I: The recommendation is convincingly justifiable based on the available scientific information alone. This recommendation is usually based on Class I data, however, strong Class II evidence may form the basis for a Level I recommendation, especially if the issue does not lend itself to testing in a randomized format. Conversely, low quality or contradictory Class I data may not be able to support a Level I recommendation.

Level II: The recommendation is reasonably justifiable by available scientific evidence and strongly supported by expert opinion. This recommendation is usually supported by Class II data or a preponderance of Class III evidence.

Level III: The recommendation is supported by available data but adequate scientific evidence is lacking. This recommendation is generally supported by Class III data. This type of recommendation is useful for educational purposes and in guiding future clinical research.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

- Nonlethal head injury
- Head injury related mortality
- Overall mortality due to motorcycle crash

Guideline Category

Prevention

Clinical Specialty

Family Practice

Internal Medicine

Nursing

Intended Users

Health Care Providers

Health Plans

Patients

Physicians

Public Health Departments

Guideline Objective(s)

- To review the literature and summarize the evidence basis for the use of motorcycle helmets
- To assess the impact of helmet use on overall mortality, head injury related mortality, nonlethal head injury after a motorcycle crash, and the impact of universal helmet laws on helmet use

Target Population

All motorcyclists

Interventions and Practices Considered

Motorcycle helmets

Major Outcomes Considered

- Overall mortality
- Lethal head injury rates
- Nonlethal head injury rates
- Impact of universal helmet laws

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

2010 Guideline

A computerized search of the world's literature was undertaken using PubMed, of the US National Library of Medicine, extending back to 1990 to the present (2009) using the key words: helmet + (motorcycle OR crash). There were 507 citations identified. The abstract for each was reviewed, and 197 candidate articles having possible applicability to the guideline topic were retrieved and reviewed. General reviews, letters to the editor, single case reports, and retrospective reviews of poor quality were excluded. This left 45 articles that were felt to have sufficient merit to form the basis for the guidelines (See Table 1 in original guideline document). The articles were reviewed in detail by the authors.

2015 Reaffirmation

PubMed, PubMed Central, the Cochrane Library, Web of Science, and CINAHL were searched from October 12, 2010 to October 12, 2015 using the search terms helmet motorcycle injury prevention, helmet injury prevention, helmet head injury prevention, and motorcycle helmet. All articles with injury and/or mortality as an outcome were included. Non-English language, non-injury outcomes, technical articles, editorials, and opinion papers were excluded.

Number of Source Documents

2010 Guideline

45 articles

2015 Reaffirmation

The final article list (N=8) was reviewed, and no articles were found to contradict the recommendations in the 2010 guideline.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Classes of Evidence

Class I: Prospective, randomized clinical trials

Class II: Clinical studies in which data were collected prospectively or retrospective analyses based on clearly reliable data

Class III: Studies based on retrospectively collected data

Methods Used to Analyze the Evidence

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

As there were no class I studies to review, the studies reviewed did not vary across the classes of evidence in a useful manner. Therefore, the authors categorized the articles in this review by study design. There were prospective cohort and cross-sectional studies. However, the majority of the studies were retrospective, either before and after cross-sectional studies of helmet law changes or cross-sectional studies of helmeted in comparison with nonhelmeted riders. Finally, the authors also identified case-control studies.

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

2010 Guideline

Recommendations were made on the basis of the studies included in the evidentiary table (see Table 1 in the original guideline document). Recommendations were classified as level 1, 2, or 3 according to the definitions listed in the "Rating Scheme for the Strength of the Recommendations" field.

2015 Reaffirmation

A comprehensive literature search was performed. Articles were first screened by title and abstract, and then salient articles were reviewed by a single reviewer. The final article list (N=8) was reviewed, and no articles were found to contradict the recommendations in the 2010 guideline. Recent research has focused on the costs attributable to unhelmeted motorcyclist crashes and comparative efficacy of different types of motorcycle helmets.

Rating Scheme for the Strength of the Recommendations

Levels of Recommendation

Level I: The recommendation is convincingly justifiable based on the available scientific information alone. This recommendation is usually based on

Class I data, however, strong Class II evidence may form the basis for a Level I recommendation, especially if the issue does not lend itself to testing in a randomized format. Conversely, low quality or contradictory Class I data may not be able to support a Level I recommendation.

Level II: The recommendation is reasonably justifiable by available scientific evidence and strongly supported by expert opinion. This recommendation is usually supported by Class II data or a preponderance of Class III evidence.

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Cost Analysis

The guideline developers reviewed published cost analyses.

Method of Guideline Validation

Not stated

Description of Method of Guideline Validation

Not applicable

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

There are prospective cohort and cross-sectional studies. However, the majority of the studies are retrospective, either before and after cross-sectional studies of helmet law changes or cross-sectional studies of helmeted in comparison with nonhelmeted riders. Finally, case-control studies were also identified.

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Reduced head injury and improved survival after motorcycle accidents

Potential Harms

Not stated

Qualifying Statements

Qualifying Statements

- The main limitation of these uncontrolled and observational studies involves the collection and incorporation in the analysis of potential confounders for the outcomes studied. The wearing of helmets is associated with multiple factors, many of which have also been shown to be associated with the incidence and severity of crashes. Rider factors include alcohol consumption, seat position on the motorcycle (driver

vs. passenger), age, and gender. There are also environmental factors such as weather, time of day; other policy factors such as speed limits and DUI laws; and other intrinsic motorcycle factors such as the size and type of motorcycle itself (the potential kinetic energy of the crash) also contribute to motorcycle crash occurrence and severity and ultimately crash consequences for the rider. Unfortunately, many of these factors are not easy to reliably measure on a crash-to-crash basis, and therefore, only nine studies, in part, adjusted for at least a portion of these factors. There were other studies that stratified the study group by various factors but did not control for them in their analysis. The majority of the studies did not control for any potential confounders. A second methodological concern is selection bias. The subjects in these studies were not selected randomly, except for the one cohort study that chose the students randomly. There were missing data, and no studies had information on those "not chosen" to confirm that they were the same as those included in the study.

- The Eastern Association for the Surgery of Trauma (EAST) is a multi-disciplinary professional society committed to improving the care of injured patients. The Ad hoc Committee for Practice Management Guideline Development of EAST develops and disseminates evidence-based information to increase the scientific knowledge needed to enhance patient and clinical decision-making, improve health care quality, and promote efficiency in the organization of public and private systems of health care delivery. Unless specifically stated otherwise, the opinions expressed and statements made in this publication reflect the authors' personal observations and do not imply endorsement by nor official policy of the Eastern Association for the Surgery of Trauma.
- "Clinical practice guidelines are systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances."* These guidelines are not fixed protocols that must be followed, but are intended for health care professionals and providers to consider. While they identify and describe generally recommended courses of intervention, they are not presented as a substitute for the advice of a physician or other knowledgeable health care professional or provider. Individual patients may require different treatments from those specified in a given guideline. Guidelines are not entirely inclusive or exclusive of all methods of reasonable care that can obtain/produce the same results. While guidelines can be written that take into account variations in clinical settings, resources, or common patient characteristics, they cannot address the unique needs of each patient nor the combination of resources available to a particular community or health care professional or provider. Deviations from clinical practice guidelines may be justified by individual circumstances. Thus, guidelines must be applied based on individual patient needs using professional judgment.

*Institute of Medicine. Clinical practice guidelines: directions for a new program. MJ Field and KN Lohr (eds) Washington, DC: National Academy Press. 1990: pg 39.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Staying Healthy

IOM Domain

Safety

Identifying Information and Availability

Bibliographic Source(s)

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EAST practice management guidelines. J Trauma. 2010 Nov;69(5):1101-11. [45 references] PubMed

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2010 Nov (reaffirmed 2015 Oct)

Guideline Developer(s)

Eastern Association for the Surgery of Trauma - Professional Association

Source(s) of Funding

Eastern Association for the Surgery of Trauma (EAST)

Guideline Committee

EAST Practice Management Guidelines Committee

Composition of Group That Authored the Guideline

Authors: Jana B. A. MacLeod, MD; J. Christopher DiGiacomo, MD; Glen Tinkoff, MD, FACS, FCCM

Financial Disclosures/Conflicts of Interest

Not stated

Guideline Status

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This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Electronic copies: Available from the Eastern Association for the Surgery of Trauma (EAST) Web site .

Print copies: Available from the Eastern Association for the Surgery of Trauma Guidelines, c/o Jana MacLeod, MD, Glenn Memorial Building, Third Floor, 69 Jesse Hill Jr. Drive, SE, Atlanta, GA 30303; email: jm7072003@yahoo.com.

Availability of Companion Documents

The following is available:

- Utilizing evidence based outcome measures to develop practice management guidelines: a primer. 2000. 18 p. Available in Portable

Document Format (PDF) from the Eastern Association for the Surgery of Trauma (EAST) Web site .

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI Institute on May 9, 2013. The currency of the guideline was reaffirmed by the developer in October 2015 and the summary was updated by ECRI Institute on November 13, 2015.

Copyright Statement

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